

# Unit 1: Organization

## Protein Synthesis

Genes (DNA): The blueprint for protein structure

\*\*\*DNA codes for proteins\*\*\*

\_\_\_\_\_ are the building blocks of proteins.

Process:

1. Transcription – complementary mRNA is made at the DNA gene
2. Translation – information from mRNA is decoded and used to make proteins

## 1. Transcription:

“Speaking the same language”

Nucleic Acid to Nucleic Acid (takes place in \_\_\_\_\_)

DNA and mRNA \_\_\_\_\_ each other

Triplet vs. Codon

Triplet vs. Codon Practice

## 2. Translation:

“Speaking different languages”

Nucleic Acid to Proteins (takes place at the \_\_\_\_\_ in the cytoplasm)

Step 1 – mRNA attaches to the ribosome

Step 2 – tRNA brings in amino acids (building blocks of proteins) according to mRNA complement

Step 3- ribosome moves mRNA along

Step 4 – tRNA moves away to recharge and let another tRNA in the picture

|            |   | Second base                                                                          |                                                     |                                                                                |                                                                                   |            |   |
|------------|---|--------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------|---|
|            |   | U                                                                                    | C                                                   | A                                                                              | G                                                                                 |            |   |
| First base | U | UUU } Phenylalanine <b>F</b><br>UUC }<br>UUA } Leucine <b>L</b><br>UUG }             | UCU }<br>UCC } Serine <b>S</b><br>UCA }<br>UCG }    | UAU } Tyrosine <b>Y</b><br>UAC }<br>UAA } Stop codon<br>UAG } Stop codon       | UGU } Cysteine <b>C</b><br>UGC }<br>UGA } Stop codon<br>UGG } Tryptophan <b>W</b> | U          | C |
|            | C | CUU }<br>CUC } Leucine <b>L</b><br>CUA }<br>CUG }                                    | CCU }<br>CCC } Proline <b>P</b><br>CCA }<br>CCG }   | CAU } Histidine <b>H</b><br>CAC }<br>CAA } Glutamine <b>Q</b><br>CAG }         | CGU }<br>CGC } Arginine <b>R</b><br>CGA }<br>CGG }                                | U          | C |
|            | A | AUU } Isoleucine <b>I</b><br>AUC }<br>AUA }<br>AUG } Methionine start codon <b>M</b> | ACU }<br>ACC } Threonine <b>T</b><br>ACA }<br>ACG } | AAU } Asparagine <b>N</b><br>AAC }<br>AAA } Lysine <b>K</b><br>AAG }           | AGU } Serine <b>S</b><br>AGC }<br>AGA } Arginine <b>R</b><br>AGG }                | U          | C |
|            | G | GUU }<br>GUC } Valine <b>V</b><br>GUA }<br>GUG }                                     | GCU }<br>GCC } Alanine <b>A</b><br>GCA }<br>GCG }   | GAU } Aspartic acid <b>D</b><br>GAC }<br>GAA } Glutamic acid <b>E</b><br>GAG } | GGU }<br>GGC } Glycine <b>G</b><br>GGA }<br>GGG }                                 | U          | C |
|            |   |                                                                                      |                                                     |                                                                                |                                                                                   | Third base |   |